

# Space Technology Game Changing Development

## Monthly Highlights

June 2013



## Mid-Year Review

The Game Changing Development Program held its Mid-Year Review June 11-13 at NASA Langley Research Center. Project managers from across multiple centers attended. The review focused on project status and the status of the overall GCD Program. Content for each area included purpose and application, goals that included Technical Readiness Levels (initial and final), current progress, and schedule among others.

Left to right, Program Director Stephen Gaddis, Program Executive Tibor Balint and Integration Manager Mary Beth Wusk ask questions during the Mid-Year Review.

## Game Changer of the Month: Chuck Taylor

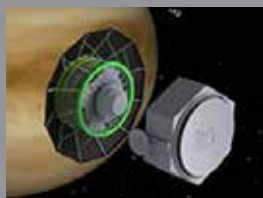
### Future Propulsion and Energy Systems Principal Investigator

**Location:** Program Office, NASA Langley

**Projects:** Advanced Space Power, Solar Electric Propulsion, Microfluidic Electrospray Propulsion

**Chuck was nominated for:** "his acute strategic management and contributions towards technical oversight required for developing and transforming technologies necessary for future high-powered Solar Electric Propulsion (SEP) vehicles. Once realized, SEP missions will have a significant impact on the space transportation of both cargo and humans, beyond Low-Earth Orbit (LEO)."

To nominate a Game Changer of the Month, contact Amy McCluskey, [amy.leigh.mccluskey@nasa.gov](mailto:amy.leigh.mccluskey@nasa.gov).



# Center Reviews Wrap up at Dryden

The Game Changing Development management team ended its center reviews with a trip to NASA's Dryden Research Center in California. The management team toured

the model shop, the Launch Vehicles Adaptive Controls Simulation room, and heard presentations on the status of existing Game Changing work as well as future work.



GCD management listens to an overview of the model shop.



The Dryden HIAD team poses in front of a torus test article.

## The Game Changers 2013 Mid-Year Review





# Composite Cryotank Success

NASA recently completed a major space technology development milestone by successfully testing a pressurized, large cryogenic propellant tank made of composite materials. The tank will enable the next generation of rockets and spacecraft needed for space exploration.

Built by Boeing at their Tukwila, Wash., facility, the almost 8-foot (2.4 meter) tank arrived at NASA Marshall in late 2012 to begin testing. Engineers insulated and inspected the tank, then put it through a series of pressurized tests to measure its ability to contain liquid hydrogen at extremely cold temperatures. The tank was cooled down to -423 degrees Fahrenheit and underwent 20 pressure cycles as engineers changed the pressure up to 135 psi. The testing experience with the smaller tank will help the team perfect the manufacturing and test plans for a much larger tank — the 18-foot (5.5 meter) tank currently being built at the Boeing facility.

The 5.5 meter tank will be one of the largest composite propellant tanks ever built. “Game Changing is about developing transformative technologies that enable new missions and new capabilities,” said Stephen Gaddis, program director for the Game Changing Development Program. “Technological advances like the cryogenic tank can ripple throughout the aerospace industry and change the way we do business.”

To watch a video about the project, click here:

<http://tinyurl.com/l2pa2rp>



The 2.4 meter tank at test facility at NASA Marshall.



The Game Changing Development management team traveled to the Boeing facility in Washington state where manufacturing of the 5.5 meter composite cryogenic tank is underway. Pictured from left to right, Chief Engineer Bob Hodson, GCD Program Executive Tibor Balint, Program Director Stephen Gaddis, Deputy Program Director Dana Gould, Communications Manager Amy McCluskey and Composite Cryotank Project Manager John Vickers.

# Game Changing Education and Public Outreach

## Robots are all the rage at Centennial Challenges

Game Changing Development Supported the second annual **Centennial Challenges Sample Return Robot** event at Worcester Polytechnical Institute June 7-8 in Worcester, Mass. Engineers Evan Laske and Mason Markee from NASA Johnson spoke with hundreds of students and members of the general public about the Robo-Glove and NASA Space Technology's innovations in robotics. Communication manager Amy McCluskey staffed the "Train R2" exhibit and spoke to students and teachers. The event drew more than 10,000 people.

### Robotics in the News



Once again, NASA's X1 Exoskeleton has been featured in the news. The website [www.myscienceacademy.org](http://www.myscienceacademy.org) has listed X1 as one of "27 Science Fictions That Became a Reality." Robonaut Project Lead from NASA Johnson Myron Diftler isn't surprised by

that attention the Iron Man-like suit is making.

"Exo is making such a mark in the media because it shows how NASA technology can have multiple benefits," said Diftler. "Not only does it have the potential to "game change" how future missions beyond LEO can keep Astronauts healthy with low mass exercise equipment, it can help folks on the ground with paraplegia and other disabilities. I believe that technology that comes from NASA also stands out and attracts the media because of NASA's reputation as a technology trail blazer."

Read the article here: <http://tinyurl.com/bfgp7re>



Sam Ortega (left) of Centennial Challenges stops by the Robo Glove exhibit staffed by JSC engineers Mason Markee and Evan Laske.



Keyke Reed (right), outreach lead with TDM, explains the R2 Kinect game to visitors at Worcester Polytechnical.

*Game On!*  
<http://gameon.nasa.gov>



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